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(54) CURRENT-CARRYING BAR

(71) We, REHAU PLASTIKS AG & CO. a Germany Company of 8673 Rehau, Rheniumhaus, Federal Republic of Germany, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:-

This invention relates to current-carrying bars, which expression as used herein means an elongate section of insulating material which incorporates strip like electric current conductors, a surface of each of which is accessible all along the length of the section for cooperation with the metallic connector pins of a current pick-up device.

Such current-carrying bars are used in current distribution systems for factories, workshops, offices, shop windows, dwellings etc. They enable current-consuming units of all kinds to be rapidly connected by way of specially designed current pick-up devices without the need for carrying out more or less expensive operations involving screwed connections. The current pick-up device can be disconnected from the current conductors with the same ease with which it can be connected to them. Thus for example, in the provision of lighting systems which are connected to their own current pick-up device, the connection can be made at any point along the current-carrying bar without the need for using lead wires. The position of such current-consuming units can be varied as required.

The known current carrying-bars are usually supported in a U-shaped carrier which may be a metallic section, formed for example by extrusion.

The insulating section may be made of a relatively hard plastic, e.g. polyvinyl chloride, conveniently by extrusion and may incorporate grooves for receiving the current conductors which are drawn into the section at a subsequent stage; the continuous opening extending along this latter element may be kept slightly smaller than the cross-sectional dimensions of the conductors so that the latter are firmly held in the grooves provided for the purpose in the section. However, current-carrying bars are also known wherein the conductors are partly surrounded by and held in place by the insulating material of the section, this arrangement being achieved during the production of the bar, for example during extrusion of the insulating material. The current-carrying bars obtained in this manner are then cut to the required length and immovably fitted in a metallic carrier.

Current-carrying bars are also known which, instead of having a metallic carrier, comprise a rod-like element of insulating material. In this case the conductors are fitted directly into the walls of this element while the latter is being produced, so that subsequent insertion of the conductors into the section becomes unnecessary.

A disadvantage common to the known current-carrying bars is that, for reasons of safety, they may only be used in positions that are out of normal reach. The use of such current-carrying bars along skirting boards, in floor channels etc. has been prohibited hitherto, since the possibility that the conductors could be touched, for example by children, cannot be excluded.

It is in this connection that use can be made of the present invention, the object of which is to provide a current-carrying bar which excludes the possibility of the conductors being accidentally touched and therefore enables such a system to be used within normal reach even under conditions in which stringent regulations are usually imposed.

According to the invention the improved current-carrying bar comprises an elongate insulating section which is made of hard plastics material and is formed to provide a

continuous central slot defined between opposed side walls on each of which one of the current conductors is positioned adjacent the base of the slot, and a pair of webs integrally formed with the insulating section and being of thinner dimensions than the side walls so as to be resilient with respect thereto, said webs having free ends which resiliently engage the respective side walls outwardly of the conductor positioned thereon whereby the conductors are shielded against accidental contact.

The two webs may extend from the base of the central slot and at an acute angle to the side walls. Alternatively the two webs may extend in opposite directions from the outer end of a central wall which extends outwardly from the base of the slot, each web being inclined inwardly towards the said base of the slot. Conveniently the free end of each web is curved inwardly towards the central axis of the slot. It is also advantageous that the webs are flexible.

The current-carrying bar in accordance with this invention offers the advantage that the current conductors cannot be inadvertently touched. Upon being introduced between the side walls and the free ends of the webs the pins of the current pick-up device press the webs towards the central axis of the central slot and away from the point at which their ends bear against the side walls of the current-carrying bar, so that openings for the passage of the pins are created. Because of their resilience, the webs in turn press the pins, when inserted, firmly against the current conductors so that the pins are prevented from lifting off the conductors and remain in constant contact therewith.

Because of the shape of the current conductors this contact occurs over a fairly large area instead of being a point contact, so that burning off of the pins is precluded.

When the current pick-up device is removed, the webs spring back into their original positions and their free ends again bear against the opposed side walls outwardly of the conductors and so as to enclose the entire surface of the conductors. The current-carrying bar is therefore again rendered safe as regards its conductors being unintentionally touched.

The insulating section and the webs are conveniently formed integrally by an extrusion process and the current conductors may be incorporated into the side walls of the slot during this process.

Two embodiments of a current-carrying bar in accordance with this invention are illustrated diagrammatically in the accompanying drawings, in which:

Figure 1 is a cross-section of one embodiment of a current-carrying bar,

Figure 2 illustrates the same bar with the connector pins of a current pick-up device in engagement, and

Figure 3 is a cross-section of a second embodiment of a current-carrying bar.

Figure 1 illustrates a current-carrying bar which consists of an insulating section 1 having current conductors 2 and 3 arranged on the side walls 11 and 12 respectively of a central slot 4. The current conductors 2 and 3 are generally flat and their side edges 21, 22 and 31, 32 respectively are secured in the insulating material of the section 1. Webs 5 and 6 formed integrally with the main body of the section 1 at the base 41 of the central slot 4 extend from a common root portion 7 into the slot and overlap the entire surface of the current conductors 2 and 3. The free ends 51 and 61 respectively of the webs 5 and 6 bear against the side walls at 111 and 121.

During production of the section 1, a predetermined bias will have been imparted to the webs 5 and 6 so that their free ends bear under a constant pressure against the side walls. Lifting of the webs 5 and 6 is thus prevented unless the pins of a current pick-up device are inserted, and this requires application of a certain force. Accordingly the webs 5 and 6 normally act to shield the conductors 2 and 3 against accidental contact.

To facilitate insertion of the pins of a current pick-up device between the side walls at 111 and 121 of the central slot 4 and the free ends of the webs 5 and 6 these ends are curved inwardly towards the central axis 42 of the slot 4.

Figure 2 illustrates the current-carrying bar of Figure 1 but with the pins 71 and 72 of a current pick-up device 7 inserted and engaged with the conductors 2 and 3 respectively. The pins 71 and 72 have pressed back the webs 5 and 6 towards the central axis 42 of the central slot 4 so that engagement of the pins 71 and 72 with the conductors 2 and 3 is possible. The resilient action of the webs 5 and 6 presses the pins 71 and 72 into engagement with the conductors 2 and 3 respectively so that there is constant contact and therefore an uninterrupted constant current pick-up.

In the embodiment of Figure 3 the webs 5 and 6 extend in opposite directions from the outer end of a central wall or longer root portion 7. When the pins are inserted the webs 5 and 6 which, in this case too, bear resiliently at their free ends 51 and 61 against the side walls at 111 and 121 respectively, are likewise urged towards the central axis 42 of the central slot 4. In this case to facilitate insertion of the pins the webs 5 and 6 are inclined towards the base of the central slot 4.

The current-carrying bar in accordance with this invention enables the connector pins 71 and 72 to bear over a fairly large

area against the contact surfaces of the current conductors 2 and 3, this contact being reinforced by the resilience of the compressed webs 5 and 6.

WHAT WE CLAIM IS:-

1. A current-carrying bar as herein defined wherein the elongate insulating section is made of hard plastics material and is formed to provide a continuous central slot defined between opposed side walls on each of which one of the current conductors is positioned adjacent the base of the slot, and a pair of webs integrally formed with the insulating section and being of thinner dimensions than the side walls so as to be resilient with respect thereto, said webs having free ends which resiliently engage the respective side walls outwardly of the conductor positioned thereon whereby the conductors are shielded against accidental contact.

2. A current-carrying bar as claimed in claim 1 wherein the webs extend from the base of the central slot and at an acute angle to the respective side walls.

3. A current-carrying bar as claimed in claim 1 wherein the webs extend in opposite directions from the outer end of a central wall which extends outwardly from the base of the central slot and the webs are inclined towards the said base.

4. A current-carrying bar as claimed in claim 2 or claim 3 wherein the free end of each web is curved inwardly towards the central axis of the central slot.

A current-carrying bar as claimed in any preceding claim wherein the conductors are positioned such that the connector pins, when inserted are biassed against their respective conductors by the resilient nature of the webs.

6. A current-carrying bar as claimed in any preceding claim wherein the insulating section and the webs are formed together by an extrusion process.

7. A current-carrying bar as claimed in claim 6 wherein the current conductors are incorporated into the said side walls during the extrusion process.

8. A current-carrying bar as claimed in any preceding claim wherein the insulating section is formed of a hard polyvinylchloride.

9. A current-carrying bar substantially as herein described with reference to Figures 1 and 2, or Figure 3 of the accompanying drawings.

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FIG. 1

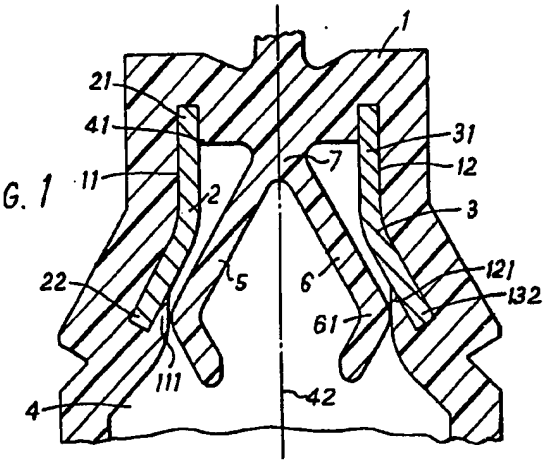
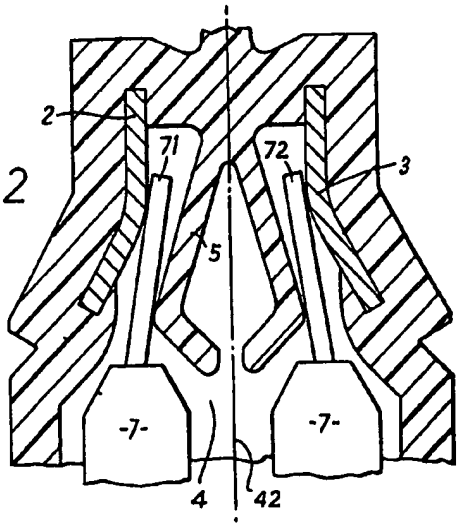


FIG. 2



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Sheet 2

FIG. 3